

Bellwork: 3/20/13

Simplify the following rational expression:

$$\begin{aligned} 1) \frac{9-x^2}{2x^2-7x+3} &= \frac{-x^2+9}{(2x^2-6x)(x+3)} = \frac{-(x^2-9)}{2x(x-3)-1(x-3)} = \frac{-(x-3)(x+3)}{(2x-1)(x-3)} \\ &= \boxed{\frac{-(x+3)}{2x-1}} \end{aligned}$$

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$$\begin{aligned} ⑦ \frac{5x^2+10xy}{15xy+30y^2} &= \frac{5x(x+2y)}{3 \cdot 5y(x+2y)} \\ &= \frac{x}{3y} \end{aligned}$$

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$$\begin{aligned}
 \textcircled{8} \quad \frac{a^2 - b^2}{b - a} &= \frac{(a+b)(a-b)}{b-a} \\
 &= \frac{(a+b)(a-b)}{-a+b} = \frac{(a+b)(a-b)}{-1(a-b)} \\
 &= \frac{(a+b)}{-1} \\
 &= -1(a+b) \text{ or } -a-b
 \end{aligned}$$

II. Multiplying Rational Expressions:

Both rational numbers and rational expressions are multiplied in the same way:

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd} \quad \text{where } b \text{ and } d \neq 0$$

Always express answers in simplest form.

$$\text{Example 1: } \frac{\frac{1}{5}a}{\frac{1}{5}c} \cdot \frac{\frac{3}{4}c}{\frac{3}{4}a} = \frac{3ad}{4ac} = \boxed{\frac{3}{4}} \quad \frac{\cancel{60}ad}{\cancel{80}ac} = \frac{3}{4}$$

$$\text{Example 2: } \frac{x^2}{x-3} \cdot \frac{(x+2)(x-3)}{2} = \boxed{\frac{x^2(x+2)}{2}}$$

Sometimes you will need to factor before you multiply in order to find the common factors so you can reduce the expression.

$$\text{Example 3: } \frac{x^2 - 9}{x^2 + x - 12} \cdot \frac{x+2}{x+3} = \frac{(x+3)(x-3)}{(x+4)(x-3)} \cdot \frac{(x+2)}{(x+3)} = \frac{(x+2)}{(x+4)}$$

$$\text{Example 4: } \frac{x^3 + 5x^2}{(x+5)^2} \cdot \frac{x^2 - 25}{x^2} = \frac{x^2(x+5)}{(x+5)(x+5)} \cdot \frac{(x+5)(x-5)}{x^2} = \boxed{x-5}$$

Homework: page 4 in packet

